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Case report

Failure of non-cultured melanocyte–keratinocyte transplantation in periungual vitiligo: A case report

Norah Alsubait [a], Sanjeev Mulekar [b,*], Ahmed Al Issa [b]

[a] *Ministry of Health, P.O. Box 85676, Riyadh 11612, Saudi Arabia*
[b] *National Center for Vitiligo and Psoriasis, P.O. Box 300320, Riyadh 11372, Saudi Arabia*

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Abstract

Background: Vitiligo is a common pigmentary skin disorder, affecting 0.5–1% of world population. It is one of the psychologically devastating skin disorders, which have different medical and surgical modalities of treatment.

Objective: To report the failure of non-cultured melanocyte–keratinocyte transplantation in periungual vitiligo.

Method: The method used was introduced by Gauthier and Surleve-Bazeille, modified by Olsson and Juhlin, and recently by Mulekar. A shaved biopsy skin sample of approximately one-fifth the size of the recipient area was used. Skin sample is incubated; cells mechanically separated using trypsin-EDTA solution, and then centrifuged to prepare a suspension. The suspension is then applied to dermabraded depigmented skin area and collagen dressing was used to keep it in place.

Results: Treated lesions on the right hand of female with stable periungual vitiligo showed very poor repigmentation (less than 10%) with only very small new brown spots.

Conclusion: Acral vitiligo is one of the difficult-to-treat areas, and further studies are required to explain the variable outcomes of non-cultured melanocyte–keratinocyte transplantation treatment of clinically stable acral vitiligo patients.

Keywords: Vitiligo; Acral vitiligo; Vitiligo treatment; Melanocyte transplantation; Vitiligo surgery

1. Introduction

Vitiligo is a common pigmentary skin disorder, characterized by total or partial loss of melanocytes from the epidermis and other tissues. It affects 0.5–1% of world population (Kanika et al., 2011). This dermatological problem is one of the most psychologically devastating and difficult to treat skin diseases (Pearl, 2005). Currently, different medical therapies for vitiligo are available, including topical and systemic corticosteroids, topical Calcineurin inhibitors, and phototherapy (Kanika et al., 2011). However, medical therapies fail to repigment lesions on the glabrous skin and rarely lead to complete repigmentation (El Zawahry et al., 2011). For such instances, and for patients in whom vitiligo has been stable, various surgical therapies have been used for the last 25 years (Pearl, 2005). Surgical techniques may be divided into two types: tissue grafting methods such as split-thickness skin graft, punch grafting and suction-blister roof grafting, and cellular grafting methods that include non-cultured keratinocytes/melanocytes and cultured melanocytes (Richard et al., 2011).

* Corresponding author. Tel.: +966 011 4916565; fax: +966 011 2549997.
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Vitiligo may affect any site of the body, but affects mainly those sites which are exposed to trauma and pressure such as knees, elbows, and fingers (David Njoo and Wiete, 2001). Hands and fingers are known to be difficult-to-treat sites (Rafal et al., 2007). Here, we report a case of periungual vitiligo, treated with autologous non-cultured melanocyte-keratinocyte cell transplantation, at the National Center for Vitiligo and Psoriasis (NCVP), Riyadh, Saudi Arabia.

A shaved biopsy skin sample of approximately one-fifth the size of the recipient area (right hand) was obtained from the donor area (upper lateral aspect of the thigh) using standard aseptic precautions. The donor area was dressed with 4 × 4 DuoDerm and sterile gauge that was cleaned and removed after one week. The skin sample was transferred to a Petri dish containing 0.2% (weight/volume) trypsin solution and incubated for 40 min at 37 °C. After 40 min of incubation, trypsin was removed with a Pasteur pipette, and the skin sample was taken out for separation. It was washed with Dulbecco's Modified Eagle Medium/F12 (DMEM/F12 medium Life Technologies, Carlsbad, CA, USA), to remove residual trypsin. The dermis was separated from the epidermis mechanically and discarded. The epidermis in the Petri dish was broken down to multiple small pieces and then centrifuged for 5 min, to facilitate the preparation of cell suspension. The floating epidermal pieces were discarded, and the cell suspension – prepared in DMEM/F12 medium using a 1 ml syringe with a detachable needle. The recipient area was anesthetized using 1% Xylocaine, and dermabraded with a diamond fraise wheel. The cell suspension was applied to the recipient area, and wound was covered directly with dry, thin collagen sheet, that was subsequently covered with sterile gauze pieces moistened with DMEM/F12. The dressing was removed after one week. The Ethics Committee of the National Center for Vitiligo and Psoriasis approved the treatment.

2. Case report

A 33-year-old married, housewife Saudi female, known case of hypothyroidism was first seen in July 2003 with depigmented lesions on her hands, neck, feet, elbows, and upper extremities for 4 years' duration. Her lesions had been non progressive since the onset, and she had a negative family history of vitiligo. The patches on her right hand measured 18.75 cm^2. She failed to respond to medical treatment. The patient underwent autologous non-cultured melanocyte–keratinocyte cell transplantation on her right hand in August 2003. Treated lesions on her right hand showed very poor repigmentation (less than 10%) with only very small new brown spots. (Figs. 1 and 2).

Figure 1. The right hand, pre-transplantation.

Figure 2. 25 days post transplantation, the right hand showing <10% repigmentation.

3. Discussion

We report periungual vitiligo treated with autologous non-cultured melanocyte–keratinocyte transplantation, with poor response to treatment, The method which was used in this case was introduced by Gauthier and Surleve-Bazeille Gauthier and Surleve-Bazeille (1992), modified by Olsson and Juhlin Olsson and Juhlin (1998) and recently by Mulekar Mulekar (2003). It is an effective procedure that takes 2–3 h and can be carried out as an outpatient treatment. Also, it has excellent cosmetically accepted outcomes, rare side effects, and simpler compared with the cultured melanocyte cell transplantation method. On the other hand, it needs trained personnel, facilities, and dedicated staff.

Poor results in an acral vitiligo treated with the same technique have been reported earlier. On reviewing the literature, studies using this method of transplantation in acral vitiligo showed variable results. Poor outcome was reported using the same technique in acral areas (El Zawahry et al., 2011; Toossi et al., 2011; Sanjeev, 2005; Njoo et al., 1998), while others showed excellent repigmentation (El Zawahry et al., 2011; Sanjeev, 2004, 2005; Sanjeev et al., 2009).

The hair follicle is considered to be the melanocyte reservoir (Rafael, 1997). The glabrous skin that is devoid of these follicles such as glans penis, eyelids, and areola and skin with sparse hair follicles as fingers, toes, elbows usually are unresponsive to medical therapies due to lack of melanocyte reservoir. Theoretically, good repigmentation is expected in all clinically stable vitiligo lesions treated sur-

gically at all anatomic sites. However, failure of repigmentation in acral lesions cannot be explained on the basis of available evidence. Several hypotheses have been put forward to explain the poor response in acral lesions, such as the absence of subcutaneous tissue, technical difficulties.

Richard et al., Richard et al. (2011) explained that the small percentage of excellent responders to such treatment in such area was mostly due to the fact that they are cases of vitiligo vulgaris with acral lesions. In our case, the patient is a case of vitiligo vulgaris with acral lesions, and showed less than 10% of repigmentation.

4. Conclusion

It is difficult to explain the variable outcomes of noncultured MKTP treatment of clinically stable acral vitiligo patients. We recommend further studies that can throw some light to explore the underlying process and the causes of such variability in such lesions. Finally, irrespective to the method used, and despite the vitiliginous type, acral lesions are considered difficult areas to repigment, and further studies are needed to see the effectiveness of retreatment in these patients.

Conflict of interest

The authors declare no conflict of interest.

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